

RESONANT CONTROLLED QUBIT SYSTEM

ABSTRACT

5 A circuit comprising a superconducting qubit and a resonant control system that is
characterized by a resonant frequency. The resonant frequency of the control system is a
function of a bias current. The circuit further includes a superconducting mechanism
having a capacitance or inductance. The superconducting mechanism coherently couples
the superconducting qubit to the resonant control system. A method for entangling a
10 quantum state of a first qubit with the quantum state of a second qubit. In the method, a
resonant control system, which is capacitively coupled to the first and second qubit, is
tuned to a first frequency that corresponds to the energy differential between the lowest
two potential energy levels of the first qubit. The resonant control system is then adjusted
to a second frequency corresponding to energy differential between the lowest two
15 potential energy levels of the second qubit.